INFORMATION SYSTEM ON CHEMISTRY OF ILLINOIS COAL

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ABSTRACT

The Information System on Chemistry of Illinois Coal (ISCIC) is a computer database of proximate and ultimate analyses and other test results on Illinois coal. The ISCIC operates on a University of Illinois computer (Cyber 175) located in Urbana. At present the data file consists of chemical results on more than 2600 samples that represent coals from throughout the Illinois mining area. Most data in the file are on samples collected from mines that are now abandoned; some data are from some active mines. Persons interested in working with this database may do so from their own terminals; the retrieval software is easy to use. Data can be obtained for any one of 24 different coal seams. Such data will aid in the evaluation of engineering and environmental problems regarding coal developments in the state. In addition, the system enables coal consumers and others to determine the location(s) of deposits that are most likely to meet their specifications. Nominal fees are charged to public users of the ISCIC and arrangements to use the system can be made by contacting the Illinois State Geological Survey.

INTRODUCTION

The objective of this project was to establish a computer based Information System on Chemistry of Illinois Coals (ISCIC) and thereby assist the coal research community to gain access to this information and work with it in ways not otherwise possible. The ISCIC comprises the results of chemical analyses of coal samples, each of which is described in a way that defines the representation of the sample, the date of its analysis, and the results of analysis. ISCIC also includes retrieval software that enables researchers at coal facilities and other public and private institutions to access the data by means of their remote terminals. It is easy to use and requires almost no experience with computers. This report describes ISCIC and gives procedures to retrieve data with characteristics specified by the user.

ISCIC has been installed on a large mainframe computer (Cyber 175) located on the Urbana-Champaign campus of the University of Illinois. Access to the computer files is permitted for nominal charges.

DESCRIPTION OF THE DATA

General description

ISCIC contains an identifying description and results of chemical analyses of more than 2,600 coal samples taken by Survey geologists during the past 75 years. Most of the chemical analyses were done at the Illinois State Geological Survey (ISGS). The data were initially placed in a confidential file, then moved to an open file when the mining company released the data or when the mine was abandoned (fig. 1). The public can now gain access to this open file with the software (SEARCH) developed for this project.

All samples in ISCIC are described by location, seam, sample type, mine and company name, and each sample contains a complete proximate analysis (moisture, ash, volatile matter and fixed carbon). Some other chemical results are filed for many samples. All analytical results, except those for moisture, are stored in the computer on a dry weight percent basis; but output tables provide results calculated to other bases.

The large majority of the samples in the data file were collected from mines that are now abandoned; however, some data on many active mines are included. These data were taken from publicly available literature, which is cited in output tables as a remark.

More than 2,400 of the data sets are of face channel or related types of samples that represent the entire seam being mined (table 1). At present the file contains 1,294 channel-type samples from the Herrin (No. 6) Coal Member, 556 from the Springfield (No. 5) Coal Member, and 586 from 22 other seams (table 1). The remaining 178 samples are bench and washed types. A bench sample represents a layer within the seam, and these are sequentially listed by laboratory number, one for each layer at the site. A washed sample represents a fraction of a channel or other gross sample that was separated by specific gravity or by another laboratory technique. Washed samples also are sequentially listed by laboratory number.

Analytical results on the forms of sulfur and heating value (Btu/lb) are given in the database for about half of the samples. About 500 samples include results of ultimate analyses: carbon, hydrogen, nitrogen, sulfur, oxygen and ash contents. In addition, many samples include results of chlorine, free swelling index (FSI), Gieseler plasticity, and ash fusion tests. The analytical data were determined by standard methods approved by the American Society for Testing and Materials, the International Standards Organization, and/or accepted by most coal analytical laboratories in the United States.

Laboratory number

Samples are identified by a sequential laboratory number according to the date of analysis. Those samples with laboratory numbers prefixed by "A" are the oldest samples, the analytical data having been determined in the U.S. Bureau
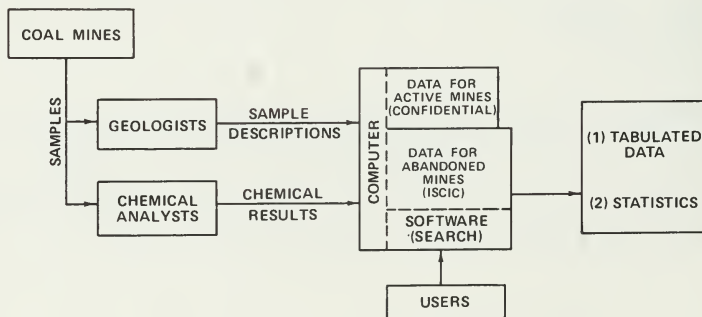
Figure 1. Construction of the database and SEARCH software.

of Mines laboratory at Pittsburgh prior to 1932. The "C" numbered series was
initiated at the ISGS in 1932 and continues to the present. Most of the "A"
samples were published by Cady (1935) and "C" samples up to C2908 appeared in
Cady (1948). A few samples are prefixed with "B". These identify results
from published literature, which is cited in the remarks section of the output
table. These analyses were made in laboratories other than the ISGS or U.S.
Bureau of Mines.

Location

All samples are located by county, township, range, section, and quarters
(e.g. NE). In the original computer file some samples were not precisely
located within the mine, so the location of the mine tipple was entered into
the ISCIC file. These samples contain "tipple" in the location space on
output listings. The mine and company names as well as a mine index number

Table 1. Distribution of C (i.e., channel, mine run) type samples.

Seam (Coal Member)*	County	No. Samples	Seam (Coal Member)	County	No. Samples
Trowbridge	Shelby	7	Dekoven	Gallatin	2
				Saline	14
Calhoun	Clay	4			
Shelbyville	Shelby	4	Davis	Gallatin	6
				Saline	12
Opdyke	Jefferson	5			
Friendsville	Richland	3	Murphysboro	Jackson	38
	Wabash	4		Williamson	5
Bristol Hill	Crawford	1	New Burnside	Johnson	4
Danville (No. 7)	(See Fig.6)	139	Bidwell	Pope	3
Herrin (No. 6)	(See Fig.5)	1294	Rock Island (No.1)	Fulton	8
				Henry	13
Briar Hill	Gallatin	2		Knox	8
				Mercer	23
Springfield (No. 5)	(See Fig.4)	556		Rock Island	6
				Warren	4
Summum (Houchin	Fulton	3			
Creek (No. 4))‡	Grundy	19	Assumption	Christian	6
	Kankakee	2			
	Knox	6	Willis	Gallatin	8
	Saline	2			
			Reynoldsburg	Pope	4
Kerton Creek	Fulton	3			
			Gentry	Macoupin	2
Cardiff	Kankakee	8			
Colchester (No. 2)	(See Fig.3)	208			

* Listed in order of increasing geologic age.
‡ The official name has recently been changed to Houchin Creek (No. 4) Coal Member.

Figure 2. Samples in database.

are given on listings to help identify and locate the sample. Coal has been mined in 73 counties of Illinois and the database contains results of samples from 59 of them (fig. 2).

Coal seam

The data file contains samples from more than half of the 40 seams that have been mined in Illinois. Seams are identified by a four digit code (table 2), increasing with increasing age (lower stratigraphic position). The seam names are decoded and written explicitly in output tables.
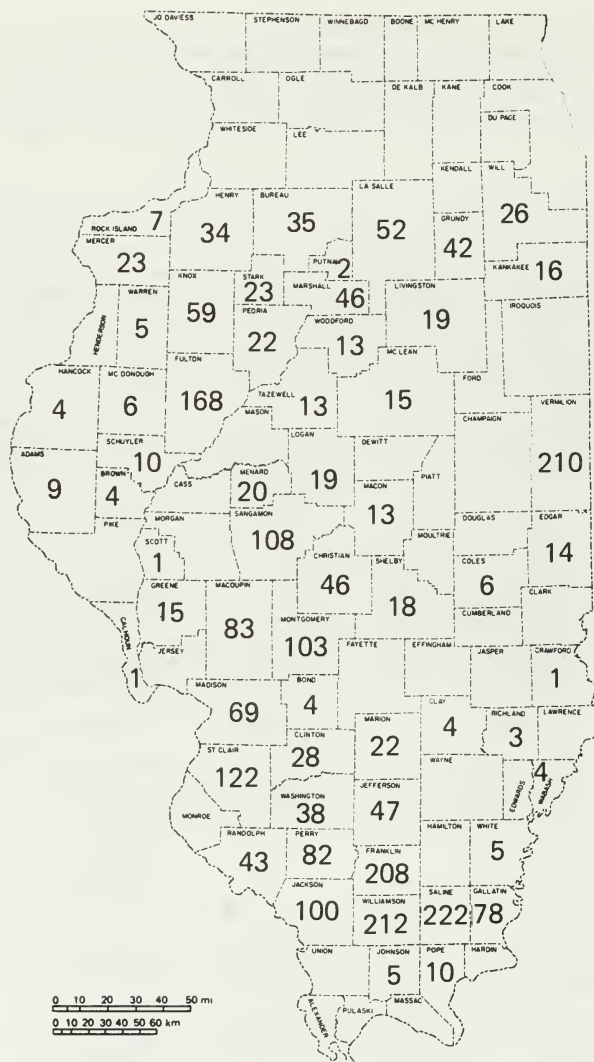
Sample type

The data included in ISCIC are classified (table 3) into three broad categories according to their sample types: channel (C) or other types of samples that represent the whole seam at the sampling site exclusive of any thick mineral partings; bench (B) type samples that represent a part of the seam; and washed (W) type samples that represent a particular float-sink or other special fraction of a channel or mine run sample. Users can retrieve data for any or all of these three categories. Categories C and B are subclassified into several sample types to give a more precise description of the sample (part II of table 3). Codes for these subclasses are given in tables of data from ISCIC. Users will need to refer to table 3 to decode the sample type when examining output tables. To retrieve data by sample type, users need only to consider the three broad categories.

Table 2. Stratigraphic names of Illinois coal seams and their ISCIC codes.

Seam (Coal Member)	Code	Seam (Coal Member)	Code	Seam (Coal Member)	Code
Wade	1640	Rock Branch	2410	Wise Ridge	3320
• Trowbridge	1670	DeGraff	2430	Mt. Rorah	3330
• Calhoun	1750	• Danville (No. 7)	2490	DeLong	3340
• Shelbyville	1760	Allenby	2520	• Murphysboro	3370
Oconee	1770	Jamestown	2610	• New Burnside	3400
• Opdyke	1780	• Herrin (No. 6)	2660	Brush	3410
Loudon	1790	Spring Lake	2670	Delwood	3430
Belle Rive	1800	• Briar Hill	2730	O'Nan	3434
McCleary's Bluff	1830	• Springfield(No.5)	2790	• Bidwell	3438
Cohn	1850	• Summum (No. 4)‡	2840	Mining City	3445
Keensburg	1860	Roodhouse	2860	Hermon	3450
• Friendsville	1870	• Kerton Creek	2870	• Rock Island (No.1)	3490
• Bristol Hill	1910	Shawneetown(Survant)	2940	Litchfield	3500
Witt	1940	Lowell	2950	• Assumption	3510
Flat Creek	1970	• Cardiff	3010	Pope Creek	3580
Flannigan	1990	• Colchester (No.2)	3020	• Willis	3590
New Haven	2130	Abingdon	3100	Tarter	3630
Womac	2180	Seelyville	3170	Manley	3650
Chapel (No. 8)	2260	Greenbrush	3200	Smith	3670
Athensville	2350	• Dekoven	3210	Bell	3785
Lake Creek	2390	Wiley	3240	• Reynoldsburg	3800
Pond Creek	2400	• Davis	3250	• Gentry	3900

• Seams represented in database.
‡ The official name has recently been changed to Houchin Creek (No. 4) Coal Member.

Table 3. Sample type categories and corresponding codes.

(I) SAMPLE TYPE CATEGORIES USED TO RETRIEVE DATA

C - This category includes several different types of samples (see below). They represent the coal seam at the sampling site. Run of mine (RM) and run of preparation plant (RP) samples are included.

B - This category includes various types of bench samples. Each sample represents a layer (or part) of the seam at the sampling site. The sample type code is sequentially numbered from top to bottom and samples at each site have sequential laboratory numbers.

W - This category includes various washed fractions separated by float-sink methods. Each sample represents a particular density fraction. The various fractions of a sample have sequential laboratory numbers.

(II) SAMPLE TYPE CODES THAT APPEAR ON TABULATED RESULTS

C - Category codes:
    FC Channel of seam; impurities > 3/8" present,but excluded.
    IC Channel of seam; impurities > 3/8" present and included in sample.
    PC Channel of seam; impurities > 3/8" not present.
    C   Column sample,same as IC or PC undifferentiated.
    DFC Drill core of seam, impurities > 3/8" present but excluded.
    DIC Drill core of seam, impurities > 3/8" present in sample.
    DPC Drill core of seam, impurities > 3/8" not present.
    DC Drill core sample, same as DFC, DIC, DPC undifferentiated.
    CFC Composite channel samples, impurities > 3/8" present but excluded.
    CIC Composite of channel samples, impurities > 3/8" present in sample.
    CPC Composite of channel samples, impurities > 3/8" not present.
    CB Composite of bench or block samples.
    CDC Composite of drill core samples.
    CC Composite of column samples.
    RM Run of mine.
    RP Run of plant (preparation).

B - Category codes (Top Bench i=1):
    BFi Channel of bench i; impurities > 3/8" present but excluded.
    BIi Channel of bench i; impurities > 3/8" present in sample.
    BPi Channel of bench i; impurities > 3/8" not present.
    Bi Bench sample of the i-TH bench of the seam, same as BFi,Bii, BPI, undifferentiated.
    BDi Drill core of bench i.

W - Category code:
    Wi - Washed coal of a specified density fraction, i fractions in set.

Most samples coded FC (face channel) have had some mineral matter excluded from the analyzed sample. Excluded were partings thicker than 3/8 inch and/or mineral nodules more than half an inch thick and 2 inches wide if they occurred at the collection site. This exclusion practice has been the standard method for channel sampling since 1911. This type of sample provides the best available estimate of the product from a mine that uses a minimum level of preparation (coal cleaning) and for determining the rank of the coal. Among the samples coded FC and analyzed prior to 1977, those samples from which no minerals were excluded cannot be differentiated. More recent samples are coded FC, IC, or PC (see table 3) depending on whether or not thick mineral matter was present or not, and if minerals were excluded or not.

Regional distribution of samples

The samples in ISCIC, including bench and washed samples, were collected from 59 counties (fig. 2). Twenty four seams are represented (table 2). Most of the seams that are not represented have not been mined to date.

The regional distribution of channel type samples from the four principal mined seams are shown in figures 3 to 6. Reference to these figures will help in retrieval of data. The nonchannel-type samples represent selected benches within the seam (161 samples from 35 sites) or represent certain density fractions (17 samples from 12 sites).

PROCEDURE AND RETRIEVAL KEYS

The procedure for using ISCIC is shown in figure 7. Option I provides the opportunity to see the manual, or to enter or read the comments and questions, or to retrieve chemical data. From either of these selections one proceeds to option II, where one of the following keys is selected:

1 - Search data for sample description and chemical composition (dry basis)
2 - Search data for sample description
3 - Search data for chemical composition (dry basis), e.g., samples with certain sulfur and ash values
4 - Stop

To obtain data by sample description, users need to provide one or more of the following criteria:

1 - State and county	2 - Township
3 - Seam	4 - Sample type

Any one or a combination of these four keys can be used at a time. Users can retrieve data for 1 through 102 counties; however, not all counties are represented in ISCIC. Also, users can get the information for 1 through 99 townships and/or various seams. Users should not retrieve data from all counties or all townships except when retrieval is restricted to certain limits of chemical values, as explained below; otherwise more data will be retrieved than is wanted.
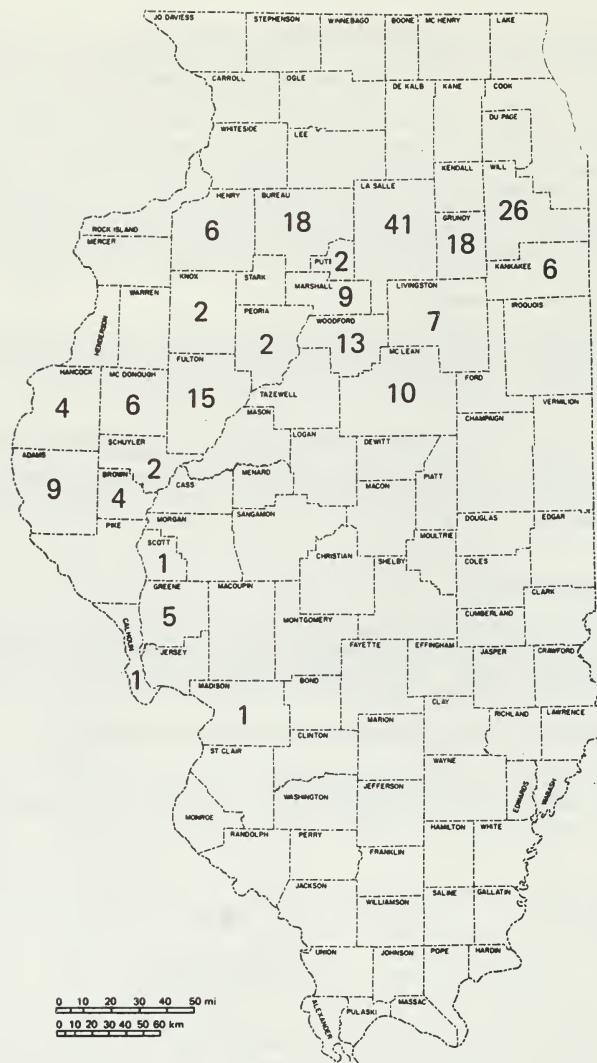
Figure 3. C-samples from Colchester (No. 2) Coal.
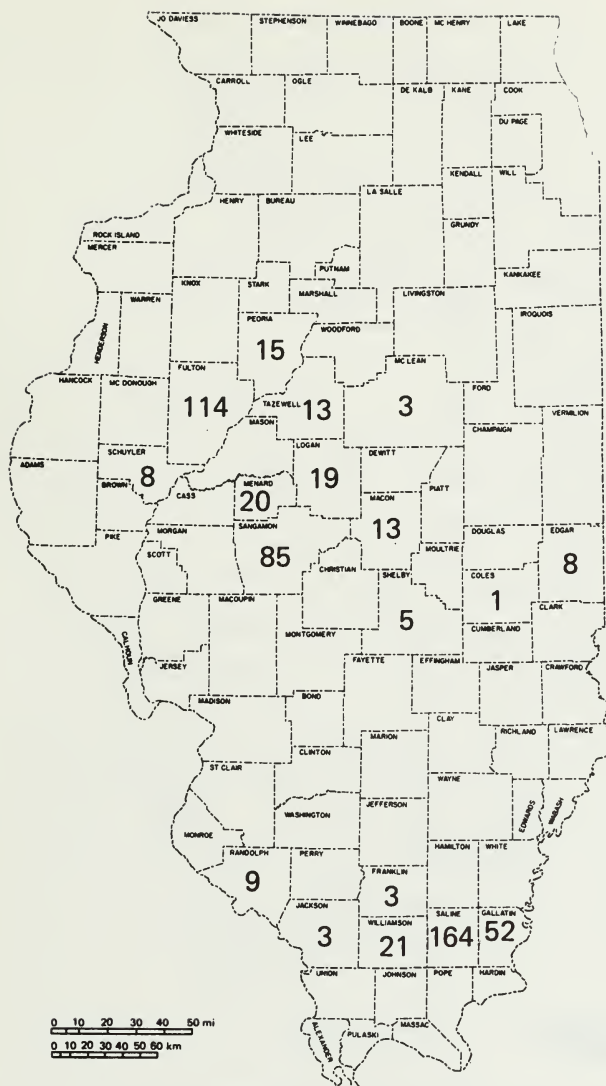
Figure 4. C-samples from Springfield (No. 5) Coal.
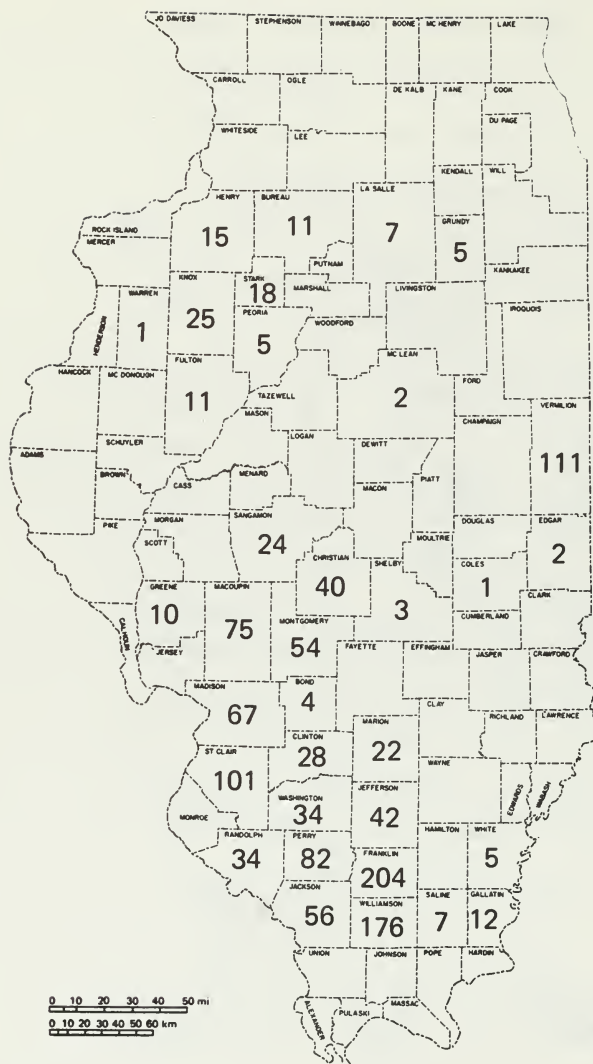
Figure 5. C-samples from Herrin (No. 6) Coal.
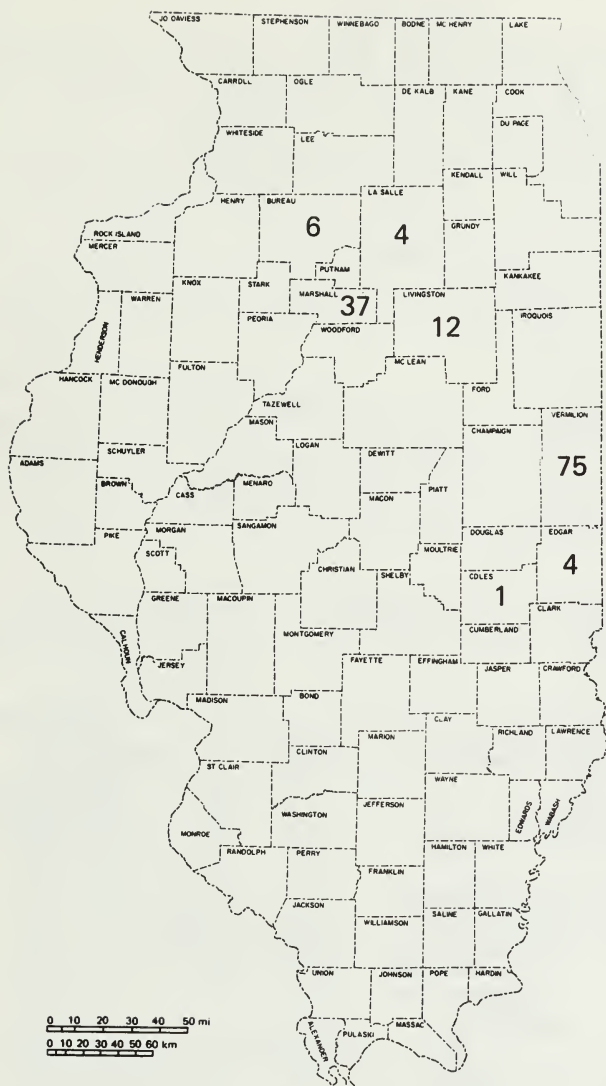
Figure 6. C-samples from Danville (No. 7) Coal.

Figure 7. Procedure for using ISCIC.

The flowchart contains the following elements:

User enters name and address

OPTION I
- enter or read C/Q* or quit
- see manual
- chemical data

OPTION II
- search data for sample description and chemical composition
- search data for sample description
- search data for chemical composition
- stop

SELECTIONS
- state and county
- township
- seam
- sample type

SELECTIONS

MOIS	TOS	C	TCI
VOL	ORS	H	WCI
FIXC	PYRS	N	FSI
ASH	SUS	O	Gieseler
		BTU	Ash Fusion

OPTION III
- ignore these results and search again
- tabulate these results
- quit

SORTING KEYS
- county
- township
- section
- seam
- sample type
- mine index
- company
- lab. no. (date of anal.)

sort data? — YES / NO

statistical data? — YES / NO

SELECTION OF BASIS
- as received
- dry
- dry ash free
- dry, mineral matter free
- moist, mineral matter free

PRINT OPTIONS
- print results at ISGS**
- off-load results to tape or floppy disk at ISGS**
- off-load results to user's computer

RESULTS
- chem. data, all bases
- stat. data, if wanted, 1-basis

OPTION IV
- search again
- enter (read) C/Q
- stop

* C/Q – comments and/or questions: filed and answered by ISCIC service staff at later time

**will be mailed to user with invoice for postage and other direct costs of ISGS   ISGS 1985

If retrieval key 1 or 3 at option II (Fig. 7) is selected, users are asked to enter no more than two chemical properties (table 4) and then enter limiting values for each property. Categories of limits (dry basis) are:

1 - Less than or equal to a specific value,
2 - Greater than or equal to a specific value,
3 - Greater than or equal to a specific value but less than or equal to another specific value.

The ranges given in table 4 provide a guide to selecting reasonable limits. If FSI, Gieseler, or ash fusion results are selected, users do not specify any limiting values. These data should only be selected after previously selecting some geological descriptor(s); otherwise more data will be retrieved than is wanted.

Retrieval by sample descriptors

To retrieve data by county, one enters the first four letters of the county of interest. Some counties require a special four letter abbreviation: Lee (LEEX), Macoupin (MCPN), Macon (MCON), White (WHTE), Whiteside (WHSD), Will (WILX), and Williamson (WLMN). The abbreviations required for ISCIC are given in table 5. Users do not have to remember these abbreviations because they may be recalled on their terminal when this option is selected.

To retrieve data by townships users will first need to prepare a list of the desired townships and then include the key for township among the selections entered after option II (fig. 7). The search program will prompt users for the number of townships desired and then it will sequentially request the township-range designation(s).

Table 4. Chemical analysis, abbreviations, and range of values in ISCIC.

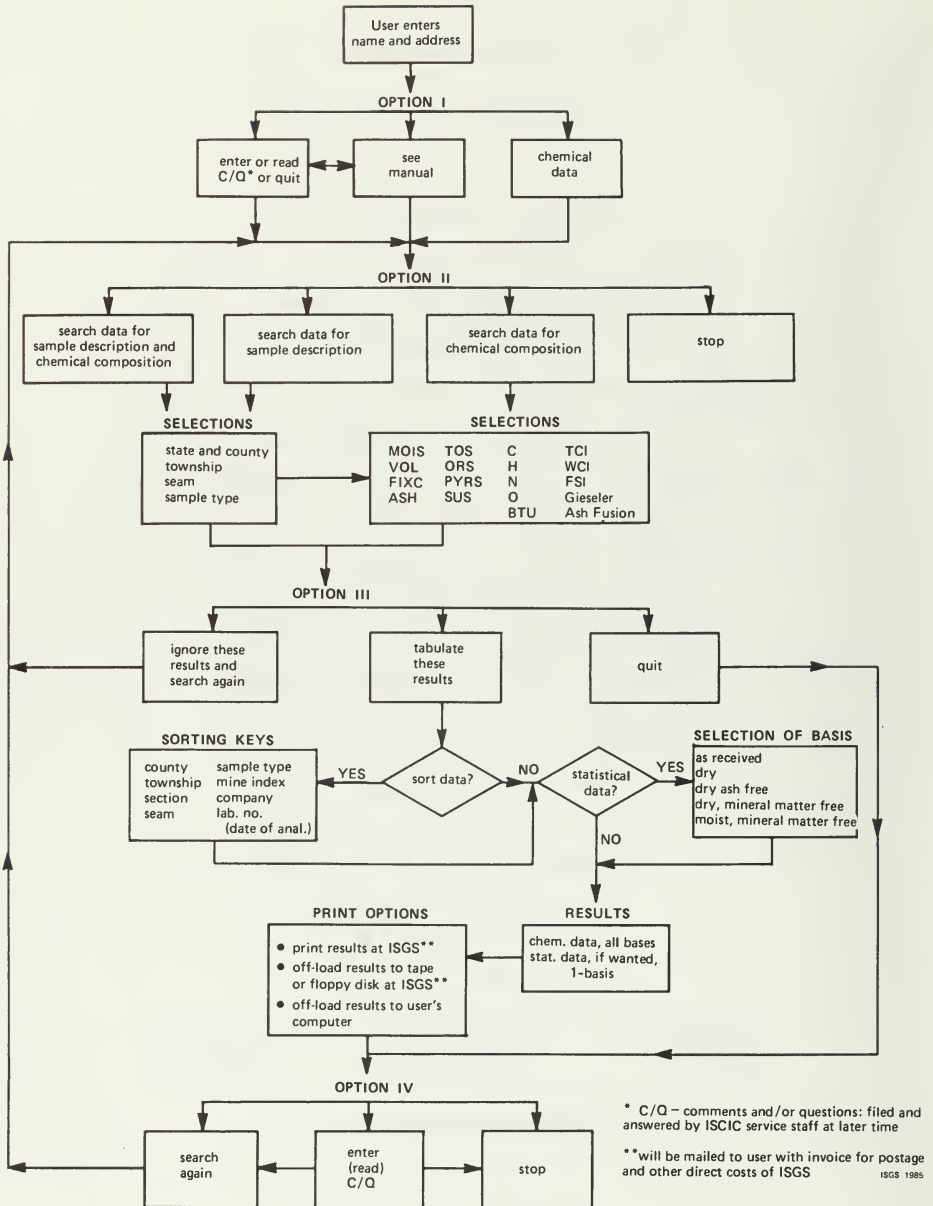| ANALYSIS (Abbreviation)	Range (Dry Basis)	Typical Range and Trends (Dry Basis)
MOISTURE (MOIS)	2-20*	10-20; < 10 in southernmost IL
VOLATILE MATTER (VOL)	31-45	33-40; < 35 in southernmost IL
FIXED CARBON (FIXC)	38-57	36-44; > 40 in southernmost IL
SULFUR, total (TOS)	2.5-10.0	
PYRITIC SULFUR (PYS)	0.5-8.0	Variable, commonly 1/2 of TOS
SULFATE SULFUR (SUS)	0.0-4.0	< 0.10 in unoxidized samples
ORGANIC SULFUR (ORS)	0.3-4.5	variable, commonly 1/2 of TOS
CARBON (C)	58-76	
HYDROGEN (H)	4-6.1	
NITROGEN (N)	0.7-1.9	
OXYGEN (O)	4-15	
CHLORINE, total (TCL)	0-0.7	0.5 in deep coal
CHLORINE, water soluble (WCL)	0-0.7	
HEATING VALUE per lb (BTU)	11,000-13,500	usually > 12,500 in southern IL
FREE SWELLING INDEX (FSI)	1-9	
GIESELER PLASTICITY, dial divisions/minute at max. fluidity (GIESELER)	0-24,000	
ASH FUSION, degree F‡ (ASH FUSION)	1,880-2,610	

* as received basis
‡ the temperatures of initial deformation, softening and fluidity.

If the key for seam is selected to retrieve by, the search program will first prompt users for the number of seams desired, then it will sequentially request the entry of the four digit code for the seam(s). An on-line table of seams and their codes is available to help users enter the desired code(s). Codes are not used in output tables.

To retrieve only a certain category of sample type, the user must include this key among the selections. The choices are limited to channel (C) and related types, bench (B) samples, washed (W) types, or all three categories. The search program prompts users to enter the category key when it is needed.

Retrieval by chemical results

Samples with specified ranges of chemical results can be retrieved by selecting "1" or "2" at option II (fig. 7). Users are first prompted to enter the particular element(s) of interest (maximum of two, such as sulfur and ash), then to enter the limiting values. Reference to table 4 will aid users in choosing meaningful limiting values. The chemical results (except mois-ture) are given in the data file on dry weight percent basis, but results for as-received; dry; dry, ash-free; dry, mineral matter-free; and moist, mineral matter-free are computed and given in the output tables (table 6).

Table 5. County names and abbreviations used in ISCIC.

COUNTY	ABRV	COUNTY	ABRV	COUNTY	ABRV
ADAMS	ADAM	HARDIN	HARD	MORGAN	MORG
ALEXANDER	ALEX	HENDERSON	HEND	MOULTRIE	MOUL
BOND	BOND	HENRY	HENR	OGLE	OGLE
BOONE	BOON	IROQUOIS	IROQ	PEORIA	PEOR
BROWN	BROW	JACKSON	JACK	PERRY	PERR
BUREAU	BURE	JASPER	JASP	PIATT	PIAT
CALHOUN	CALH	JEFFERSON	JEFF	PIKE	PIKE
CARROLL	CARR	JERSEY	JERS	POPE	POPE
CASS	CASS	JODAVIESS	JODA	PULASKI	PULA
CHAMPAIGN	CHAM	JOHNSON	JOHN	PUTNAM	PUTN
CHRISTIAN	CHRI	KANE	KANE	RANDOLPH	RAND
CLARK	CLAR	KANKAKEE	KANK	RICHLAND	RICH
CLAY	CLAY	KENDALL	KEND	ROCK ISLAND	ROCK
CLINTON	CLIN	KNOX	KNOX	ST. CLAIR	STCL
COLES	COLE	LAKE	LAKE	SALINE	SALI
COOK	COOK	LA SALLE	LASA	SANGAMON	SANG
CRAWFORD	CRAW	LAWRENCE	LAWR	SCHUYLER	SCHU
CUMBERLAND	CUMB	LEE	LEEX	SCOTT	SCOT
DEKALB	DEKA	LIVINGSTON	LIVI	SHELBY	SHEL
DEWITT	DEWI	LOGAN	LOGA	STARK	STAR
DOUGLAS	DOUG	MC DONOUGH	MCDO	STEPHENSON	STEP
DUPAGE	DUPA	MC HENRY	MCHE	TAZEWELL	TAZE
EDGAR	EDGA	MC LEAN	MCLE	UNION	UNIO
EDWARDS	EDWA	MACON	MCON	VERMILION	VERM
EFFINGHAM	EFFI	MACOUPIN	MCPN	WABASH	WABA
FAYETTE	FAYE	MADISON	MADI	WARREN	WARR
FORD	FORD	MARION	MARI	WASHINGTON	WASH
FRANKLIN	FRAN	MARSHALL	MARS	WAYNE	WAYN
FULTON	FULT	MASON	MASO	WHITE	WHTE
GALLATIN	GALL	MASSAC	MASS	WHITESIDE	WHSD
GREENE	GREE	MENARD	MENA	WILL	WILX
GRUNDY	GRUN	MERCER	MERC	WILLIAMSON	WLMN
HAMILTON	HAMI	MONROE	MONR	WINNEBAGO	WINN
HANCOCK	HANC	MONTGOMERY	MONT	WOODFORD	WOOD

OTHER OPTIONS

In addition to the options for data retrieval, ISCIC provides the users with further options for sorting the data, computing statistical values, and printing the results at ISGS or transferring the results to remote stations. Users are also given an opportunity to enter comments or ask questions.

Table 6. Output from SEARCH.

	BASIS	MOIS	VOL	FXC	ASH	PYS	ORS	SUS	TOS	CL	BTU	H	C	N	O
COUNTY: SANGAMON NENESW17 17N 4W, MINE: , COMPANY:WILLIAMSVILL, DATE OF ANALYSIS: 9/01/1908															
MINE INDEX - 40	AR	15.4	36.5	39.5	8.6				3.4		10872				
LAB NO - A 1792	DRY		43.2	46.7	10.1				4.1		12849				
SEAM - SPRINGFIELD	DAF		48.0	52.0					4.5		14298				
KNS(FT) - 5.67	DMMF		46.9												
MPL TYP - C	MMMF	17.3									12043				
OTHER RESULTS -															
REMARKS -															
COUNTY: SANGAMON SENENE19 16N 5W, MINE: , COMPANY:SPRING CRKCC, DATE OF ANALYSIS: 9/15/1921															
MINE INDEX - 120	AR	13.2	37.0	41.2	8.7				3.7		11121				
LAB NO - A81452	DRY		42.6	47.4	10.0				4.3		12810				
SEAM - SPRINGFIELD	DAF		47.3	52.7					4.7		14233				
KNS(FT) - 5.5	DMMF		46.1												
MPL TYP - FC	MMMF	14.9									12344				
OTHER RESULTS -															
REMARKS -															
COUNTY: SANGAMON SESWSE12 16N 4W, MINE:FARRAND , COMPANY:FERRAND CC , DATE OF ANALYSIS: 7/14/1949															
MINE INDEX - 641	AR	13.9	36.2	41.2	8.6				3.9		10820	5.8	60.4	1.2	20.2
LAB NO - C 6183	DRY		42.1	47.9	10.0				4.5		12567	5.0	70.2	1.4	9.1
SEAM - SPRINGFIELD	DAF		46.8	53.2					5.0		13963	5.6	78.0	1.6	10.1
KNS(FT) - 5.5	DMMF		45.6									5.5	78.9	1.6	13.9
MPL TYP - FC	MMMF	15.7									11996				
OTHER RESULTS - ASH FUSION: INIT 1918,SOFT 2029,FLUID 2108°F															
REMARKS -															
COUNTY: SANGAMON SWSWSE12 16N 3W, MINE:FARRAND , COMPANY:FERRAND CC , DATE OF ANALYSIS: 7/14/1949															
MINE INDEX - 641	AR	14.7	35.6	40.7	9.0				3.6		10662	5.9	59.6	1.2	20.9
LAB NO - C 6184	DRY		41.7	47.7	10.6				4.2		12500	5.0	69.8	1.4	9.2
SEAM - SPRINGFIELD	DAF		46.6	53.4					4.7		13982	5.6	78.1	1.6	10.3
KNS(FT) - 5.4	DMMF		45.4									5.5	79.1	1.6	13.6
MPL TYP - FC	MMMF	16.6									11876				
OTHER RESULTS - ASH FUSION: INIT 1954,SOFT 2039,FLUID 2007°F															
REMARKS -															
COUNTY: SANGAMON SENENW16 17N 5W, MINE:EDDY , COMPANY:EDDY CC, DATE OF ANALYSIS: 8/16/1962															
MINE INDEX - 861	AR	12.3	38.6	41.7	7.5				3.6	0.14	11295				
LAB NO - C12494	DRY		44.0	47.5	8.5				4.1	0.17	12880				
SEAM - SPRINGFIELD	DAF		48.1	51.9					4.5	0.18	14076				
KNS(FT) - 5.74	DMMF		47.1												
MPL TYP - FC	MMMF	13.7									12354				
OTHER RESULTS - GIESELER: SOFT 395,MAX 412,SOLID 448°C,MAX DIV. 30; FSI 3.5															
REMARKS -															

STATISTICS FOR CHEMICAL RESULTS ANALYSED ON
AS RECEIVED BASIS

ANALYSIS	NO. OF SAMPLES	MEAN	TYPICAL RANGE	
MOIS	5	13.9	12.7	15.1
VOL	5	36.8	35.6	37.9
FXC	5	40.9	40.0	41.7
ASH	5	8.5	7.9	9.1
PYS	NO DATA			
ORS	NO DATA			
SUS	NO DATA			
TOS	5	3.54	3.36	3.72
CL	1	.14	.14	.14
BTU	5	10954	10701	11206
H	2	5.9	5.8	5.9
C	2	59.9	59.3	60.5
N	2	1.2	1.1	1.2
O	2	20.5	20.0	20.9

Sorting

The retrieved data can be sorted by any one or a combination of the following:

1 - County	2 - Township and range
3 - Section	4 - Seam
5 - Sample type	6 - Mine index (samples from a mine are listed together)
7 - Coal company	8 - Lab number (Date of analysis)

For example, if one wanted the output table to list the data sorted first by county, then by coal company, and then by sample type, one would enter the number(s) chosen from the above list as 175.

Statistics

The statistical computations give the mean and typical range (mean + and - the standard deviation) for each of the chemical parameters in the data retrieved, calculated to one of the following bases chosen by the user:

1 - As received	4 - Dry, mineral matter-free
2 - Dry	5 - Moist, mineral-matter-free.
3 - Dry, ash-free	

The results of the statistical computations are listed at the end of the output table (table 6).

Enter/read comments or questions

ISCIC enables users to both enter and read comments and questions which are routinely responded to by the ISGS staff. This comment/question section can serve as a "bulletin board" among the users.

USES OF THE DATA

General uses

Chemical data on coal deposits are used to:

- Assess the quality of coal deposits under specific land holdings near those included in the database to help determine the commercial value of the deposit.

- Assess the quality of coal resources within a region or in the whole state, needed for long range planning.

- Evaluate environmental aspects related to coal developments.

- Determine which coals meet specifications for various research and commercial uses.

Additional uses will probably be discovered as more people gain access to the database and apply the data to their needs.

Users desiring to forecast the quality of unmined coal should be aware that some bias may be inherent in the data because mining, and thus sampling, has been concentrated in relatively shallow deposits and in relatively low sulfur areas, such as in Franklin and parts of adjacent counties. Thus the sulfur and perhaps the chlorine contents of coal that will be mined in the future may not be so low. Those wanting to forecast the quality of a mine product as input to a modern preparation plant from data on sample types coded FC should keep in mind the mineral matter that may or may not have been excluded from most FC coded samples.

Remarks on the chemical results

A few comments should be made about the output table of chemical data. A blank in the table for any of the chemical analyses indicates that no analysis was done for that particular compound or element. Blanks are not included in the statistical calculations. A zero (0, appearing due to rounding) indicates that the value is between 0 and 0.04 and it is taken as zero in the statistical calculations. Also, the rounding "error" may lead to some confusion. If one retrieves data by specifying a limiting value for a chemical compound or element, the results can appear anomalous on the output table. For example, if you want to retrieve all data for which SUS (sulfate sulfur) is less than 1.68, a sample with a SUS value 1.67 will be retrieved, but it will be printed as 1.7 in the table due to rounding. Lastly, ultimate analyses (C, H, N, S, O) may not total exactly 100.0 percent due to rounding.

USER ACCESS

Direct access from remote terminal

Users with modem-equipped terminals are given instructions and the needed codes to access the computer and ISCIC.

ISCIC provides users with two options to obtain retrieved data. These will appear as print options at the user's terminal near the end of the program:

        Option 1 - The tabulated results are printed at ISGS and mailed
                   to the user together with an invoice:
                   (a) postage (first class mail)
                   (b) $0.30 per page (about 5 samples are printed per page)
                   (c) $5.00 computer fee
        Option 2 - To off-load the tabulated results to disk or tape at the
                   ISGS (for mailing to you), or to off-load the results to
                   your computer equipment.

Option 2 requires users to assign a name to the file of retrieved data, which is saved in the permanent file space on the computer. The file is 132 characters wide and printers need to be set to this width.

Service to users without a terminal

Persons without a terminal can obtain data on Illinois coals by completing a data request form (see copy in appendix) and mailing it to the ISGS. Extra copies are available on request. ISGS staff will retrieve the requested data and return results by mail along with invoice for computer charges, paper, and postage.

CHARGES

Investigators wishing to use ISCIC are required to set up a credit account at the Illinois State Geological Survey, under the Natural Resources Information Fund. Rules governing the Natural Resources Information Fund specify that direct charges be assessed for services such as the ISCIC. Users will need to establish a credit account with the ISGS or make a cash deposit. Those who plan to make frequent use of the system are assigned a project specification (PS) number from the ISGS. A monthly statement will be mailed to the user. Those who wish to obtain data once or twice a year should complete a Data Request Form (by telephone or mail service). The ISGS will send the printed data by mail along with the billing statement.

References cited

Cady, G. H., 1935, Classification and selection of Illinois coals: Illinois State Geological Survey Bulletin 62, 354 p.

Cady, G. H., 1948, Analysis of Illinois coals: Illinois State Geological Survey supplement to Bulletin 62, 77 p.

APPENDIX. DATA REQUEST FORM
            Information System on Chemistry of Illinois Coals

Complete the following and send to: Coal Section
                                     Illinois State Geological Society
                                     615 E. Peabody Dr.
                                     Champaign, IL   61820
                                     (217) 344-1481

Name: _____   Address: _____

Phone: _____   _____

                                                  _____

          If no account has been established, please apply to the Financial
          Office at the above address.

          An invoice will accompany the tabulated listing of requested data
          according to the schedule:

               $5.00 computer and handling service
               $0.30 each page of data (5 samples per page)
               $____ postage (1st class). Multiple requests packaged together.

Unless otherwise arranged, the data will be printed at the Survey and mailed
to the requestor.

A. To aid us in meeting your needs, briefly describe your objective(s):

    _____

    _____

    _____

    _____

B. Consider the following optional categories to retrieve data and enter
    1,2, or 3: _____

    1. Retrieve only by sample descriptor(s)
            (e.g., location of collection site, and/or seam or sample type).

    2. Retrieve only by particular chemical results
            (e.g., sulfur less than or more than some value).

    3. Retrieve by both 1 and 2 categories.

4. Check and give descriptors you want data retrieved for:

___ county _____, _____, _____, _____; or all _____.

___ township range _____, _____, _____, _____, _____; or all _____.

___ seam _____, _____, _____, _____; or all _____.

___ sample type (C, B, or W, or any combination. See table 3: ____.

5. Enter the chemical property(ies) you need samples retrieved by,
   e.g., S, ash, etc. and the limiting value or range):

   Property (2 maximum)   Limiting value or range (see table 4)

   _____   _____

   _____   _____

6. (Optional). If you want the data sorted, indicate by number the
   desired sorting sequence.

   county _____   sample type _____

   township _____   mine index _____

   section _____   company _____

   seam _____   lab. no. _____
                               (date of analysis)

7. (Optional). If you want statistical values (mean and typical
   range) of each chemical property for all samples requested, indicate
   the one basis you want: as received _____, dry _____, dry ash
   free _____, dry mineral-matter-free _____, moist, mineral-matter-
   free _____.

You will receive a table listing analyses of all samples retrieved, calculated
to all five bases. The statistical results for the samples retrieved will be
printed at the bottom on the table.